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I also certify that the application is now proceeding in the name as identified herein.

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Signed

*H. Behan*

Dated 14 December 2004

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GB0325711.0

By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of:-

INTELLIGENT ELECTRICS (INTELLECTUAL PROPERTY) LIMITED  
Sunny Acres  
Bridport Road  
Winterbourne Steepleton  
DORCHESTER  
DT2 9DX  
United Kingdom  
ADP No. 08966152002]

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GB0325711.0

By virtue of a direction given under Section 30 of the Patents Act 1977, the application is proceeding in the name of:-

INTELLIGENT ELECTRICS (DISTRIBUTORS) LIMITED  
Incorporated in the United Kingdom  
Sunny Acres, Bridport Road  
Winterbourne, Steepleton  
Dorchester DT2 9DX  
United Kingdom  
ADP No. 08948820001

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Patents Form 1/77

4 NOV 2003

Patents Act 1977  
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RECEIVED BY FAX**Request for grant of a patent**

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

- 4 NOV 2003

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1. Your reference

HAR.MKIIBMS

04NOV03 EB49393-1 C43002  
P01/7700 0.00-0325711.02. Patent application number  
(The Patent Office will fill this part in)

0325711.0

3. Full name, address and postcode of the or of each applicant (underline all surnames)

INTELLIGENT ELECTRICS LIMITED  
SUNNY ACRES  
BRIDPORT ROAD  
WINTERBOURNE STEEPLETON  
DT2 8QJ

Patents ADP number (if you know it)

If the applicant is a corporate body, give country/state of its incorporation

A BRITISH COMPANY

8598312003

4. Title of the invention

ENERGY SAVING

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

PROSPECT ASSOCIATES  
PROSPECT CENTRE  
17b CAMBRIDGE ROAD  
WEYMOUTH  
DT4 9TJ

Patents ADP number (if you know it)

07482781001

7640576002

6. Priority: Complete this section if you are declaring priority from one or more earlier patent applications, filed in the last 12 months.

Country

Priority application number  
(if you know it)Date of filing  
(day / month / year)

7. Divisionals, etc: Complete this section only if this application is a divisional application or resulted from an entitlement dispute (see note d)

Number of earlier UK application

Date of filing  
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8. Is a Patents Form 7/77 (Statement of inventorship and of right to grant of a patent) required in support of this request?

YES

Answer YES if

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- Otherwise answer NO (see note d)

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9. Accompanying documents: A patent application must include a description of the invention. Not counting duplicates, please enter the number of pages of each item accompanying this form:

Continuation sheets of this form

Description

Claim(s)

Abstract

Drawing(s)

6

3

1

1 only

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for a preliminary examination and search (Patents Form 9/77)

Request for a substantive examination (Patents Form 10/77)

Any other documents (please specify)

11. I/We request the grant of a patent on the basis of this application.

Signature(s)

Date 4/11/03

12. Name, daytime telephone number and e-mail address, if any, of person to contact in the United Kingdom

MICHAEL WHELLER

01305 780565

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Aug 03

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**ENERGY SAVING**

This invention concerns the remote control of devices such as items of electrical apparatus, especially but not exclusively for reducing the power  
5 consumed thereby.

Our copending patent application GB 0324349.0 describes a system for controlling electrical apparatus remotely in response to changes of a variable, which system comprises a sensor to sense the variable, a controller operatively associated with the sensor and including a radio transceiver operative to transmit  
10 a control signal when the variable changes and to transmit and receive system management signals, and a responder arranged remote from the controller and including a radio transceiver operative to receive the control signal and to receive and transmit system management signals.

Among other features, it was noted in patent application GB 0324349.0  
15 that the system thereof could include a plurality of responders and that it could be operatively connected to a building management system. Further research now shows that a system with a plurality of responders can be arranged to control a plurality of devices with different functions in response to changes of a plurality of different variables, and this is an object of the present invention.

20 Thus according to the present invention there is provided a system for controlling a plurality of controlled devices remotely in response to changes of a plurality of variables, which system comprises a plurality of sensors to sense the

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variables, a controller operatively associated with the sensors and including a radio transceiver operative to transmit a plurality of control signals respectively corresponding to sensed changes of said variables and to transmit and receive system management signals, and a plurality of responders respectively associated  
5 with the controlled devices and each including a radio transceiver operative to receive a said control signal for its associated device and to receive and transmit system management signals.

Those skilled in the science will appreciate that a system according to the present invention allows many different devices (lights, space heaters, water  
10 heaters, chillers, computers and so forth) in different places to be controlled according to changes in a variety of variables (ambient temperature, light level, presence or absence of personnel and so forth). In effect the system can substitute for a building management system without the need for extensive and expensive wiring conventionally associated with building management systems.

15 By way of illustrating the versatility of the present invention, the system may be arranged on its input side so that a said sensor senses (a) the presence or absence of users of a said device, through a passive infra-red (PIR) device or the like, or through an input from an intruder alarm, (b) ambient temperature or ambient light level and/or electrical mains power supply. On its output side the  
20 system may be arranged to control electrical lighting (including emergency lighting), heating or cooling apparatus and/or any other devices that need to be controlled, whether for energy saving or other purposes.

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Preferably at least one of said responders comprises a repeater for the control signals, to allow the system to operate satisfactorily over an extended range. It is also preferred that the system include a computer interface whereby a specific control signal can be ascribed to a specific responder.

5 A said sensor of the system is preferably incorporated in a transponder operative to transmit to the controller radio signals representative of changes in the variable sensed by that sensor. The system may include a plurality of said transponders having sensors sensing mutually different variables. And preferably the or each transponder includes a radio transceiver the same as the radio  
10 transceivers of the controller and the responders, to simplify manufacture and reduce system costs.

Other features of the present invention will be apparent from the following description, which is made by way of example only with reference to the accompanying drawing in which -

15 Figure 1 provides a schematic overview of a system described in our copending patent application GB 0324349.0 and

Figure 2 schematically the development of that system to provide the present invention.

The system specifically described in patent application GB 0324349.0  
20 comprises a controller and a plurality of responders all of which are generally similar and each of which includes a radio module 20 comprising a transceiver 22 and a processor 24 connected to the transceiver 22 by means of a serial port to

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manage communications between the transmitter and receiver sides of the transceiver 22. The transceiver 22 is an RF211 radio transceiver IC operating at 868MHz and the processor 24 is an AT mega 16 microcontroller IC, both of which items are supplied by Atmel, but those skilled in the science will appreciate that other units may be used. An ISP programmer (STK500) 26 is operatively associated with the processor 24. Each unit also includes a common power supply unit 28 arranged to deliver 3.3V from either electrical mains 30 or battery 32 supply. The system is operated and monitored through one or more of keypad 34, a control button panel 36, a light-emitting diode (LED) indicator 38, and a liquid crystal display (LCD) 40. A interface 42 to a personal computer (not shown) is connected to the radio module 20 by way of an input/output device 44 incorporating a serial port for Hypertextual communications. A sensor 14 is connected to the radio module 20 by way of the input/output device 44. Finally, each responder 18 includes a 16A relay unit 46 in the power supply to a device (not shown) to be controlled.

The device is controlled according to changes in a variable sensed by the sensor 14. As specifically described in patent application GB 0324349.0, the device comprises lighting for a room and the sensor comprises a PIR detector, so that the lighting is switched on only when people are present in the room. However it is to be understood that other kinds of devices may be controlled, in accordance with changes in other variables. For instance a heater may be controlled in inverse relation to ambient temperature.

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A system according to the present invention as shown in Figure 2 comprises a controller 70, two transponders 72a and 72b and two responders 74a and 74b respectively corresponding to the transponders 72a and 72b. All are generally of the form shown in Figure 1 and in particular each includes a transceiver. The transponders 72a and 72b each also include a sensor and the responders 74a and 74b each also include a relay. (The sensors and relays are not shown in Figure 2). For the sake of explanation it will be assumed that the sensor of the transponder 72a is a PIR movement detector, that the relay of the responder 74a controls an electrical lighting unit (not shown) in a first room, that the sensor of the transponder 72b senses ambient temperature and that the relay of the responder 74b controls an electrical heater in a second room.

Initially, both of the first and second rooms are taken to be unoccupied. If a person enters the first room, this is sensed by the PIR detector and the transceiver of the transponder 72a transmits a signal representative of that. This signal is received by the transceiver in the controller 70 and this in turn transmits a respective control signal. The control signal is received by the responder 74a and the relay thereof is then actuated to switch on the lights in the first room. In much the same way, if the ambient temperature in the second room falls below a certain level, this is sensed by the sensor incorporated in the transponder 72b and the transceiver thereof transmits a signal representative of that. This signal is received by the transceiver in the controller 70 and this in turn transmits a respective control signal. The control signal is received by the

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responder 74b and the relay thereof is then actuated to switch on the heater in the second room.

Those skilled in the science will appreciate that various modifications and adaptations of the system as described may be made without departing from the essence of the invention. For instance, there may be other, possibly many, transponders with sensors sensing other variables and other responders controlling different devices. A personal computer connected to a processor 24 may be provided with a graphical user interface to aid management. And, subject to the provision of a satisfactory antenna, a controller may be incorporated in a personal computer to facilitate control. Where proportional control is required, the relays may be replaced by suitable control mechanisms as outlined in patent application GB 03244349.

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**CLAIMS**

1 A system for controlling a plurality of controlled devices remotely  
in response to changes of a plurality of variables, which system comprises a  
5 plurality of sensors to sense the variables, a controller operatively associated with  
the sensors and including a radio transceiver operative to transmit a plurality of  
control signals respectively corresponding to sensed changes of said variables  
and to transmit and receive system management signals, and a plurality of  
responders respectively associated with the controlled devices and each including  
10 a radio transceiver operative to receive a said control signal for its associated  
device and to receive and transmit system management signals.

2 A system for controlling a plurality of controlled devices as claimed  
in Claim 1 wherein a said sensor senses the presence or absence of users of a  
said device.

15 3 A system for controlling a plurality of controlled devices as claimed  
in Claim 2 wherein a said variable comprises an output from an intruder alarm  
for premises containing the controlled devices.

4 A system for controlling a plurality of controlled devices as claimed  
in Claim 1 wherein a said variable is a natural variable.

20 5 A system for controlling a plurality of controlled devices as claimed  
in Claim 4 wherein a controlled device comprises heating apparatus and the  
natural variable is ambient temperature.

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6 A system for controlling a plurality of controlled devices as claimed in Claim 3 wherein a controlled device comprises electrical lighting apparatus.

7 A system for controlling a plurality of controlled devices as claimed in Claim 6 wherein a said sensor senses electrical mains power and the electrical  
5 lighting apparatus comprises emergency lighting arranged to be turned on if the electrical mains power fails.

8 A system for controlling a plurality of controlled devices as claimed in Claim 6 wherein the electrical lighting apparatus comprises a fluorescent unit including a dimmable ballast operatively associated with the associated responder  
10 and adjustable thereby.

9 A system for controlling a plurality of controlled devices as claimed in Claim 8 wherein adjustment of the dimmable ballast by the associated responder is such that the perceived output of the fluorescent unit varies substantially linearly..

15 10 A system for controlling a plurality of controlled devices as claimed in any of Claims 6 to 8 wherein the sensor senses ambient light level.

11 A system for controlling a plurality of controlled devices as claimed in any preceding claim wherein at least one of said responders comprises a repeater for the control signals.

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12 A system for controlling a plurality of controlled devices as claimed in any preceding claim including a computer interface whereby a specific control signal can be ascribed to a specific responder.

13 A system for controlling a plurality of controlled devices as claimed in  
5 any preceding claim wherein a said sensor is incorporated in a transponder operative to transmit to the controller radio signals representative of changes in the variable sensed by that sensor.

14 A system for controlling a plurality of controlled devices as claimed in Claim 13 including a plurality of said transponders having sensors sensing mutually  
10 different variables.

15 A system for controlling a plurality of controlled devices as claimed in Claim 13 or Claim 14 wherein the or each transponder includes a radio transceiver the same as the radio transceivers of the controller and the responders.

16 A system for controlling a plurality of controlled devices substantially  
15 as hereinbefore described with reference to and as shown in the accompanying drawings.

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**ABSTRACT****ENERGY SAVING**

5       A development of a remote control system described in patent application GB 0324349.0 comprises a controller 70, two transponders 72a and 72b and two responders 74a and 74b respectively corresponding to the transponders 72a and 72b. All are generally similar and each includes a radio transceiver. The transponders 72a and 72b also include sensors (not shown) respectively sensing  
10 different variables and the responders 74a and 74b also include relays (not shown) controlling different devices. When a sensor senses a change in its sensed variable it signals this to the controller 70 which instructs the corresponding responder to control its associated device accordingly. Other transponders and responders may be added to build up a wireless building management system.

15    [Use Figure 2]

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Fig 1

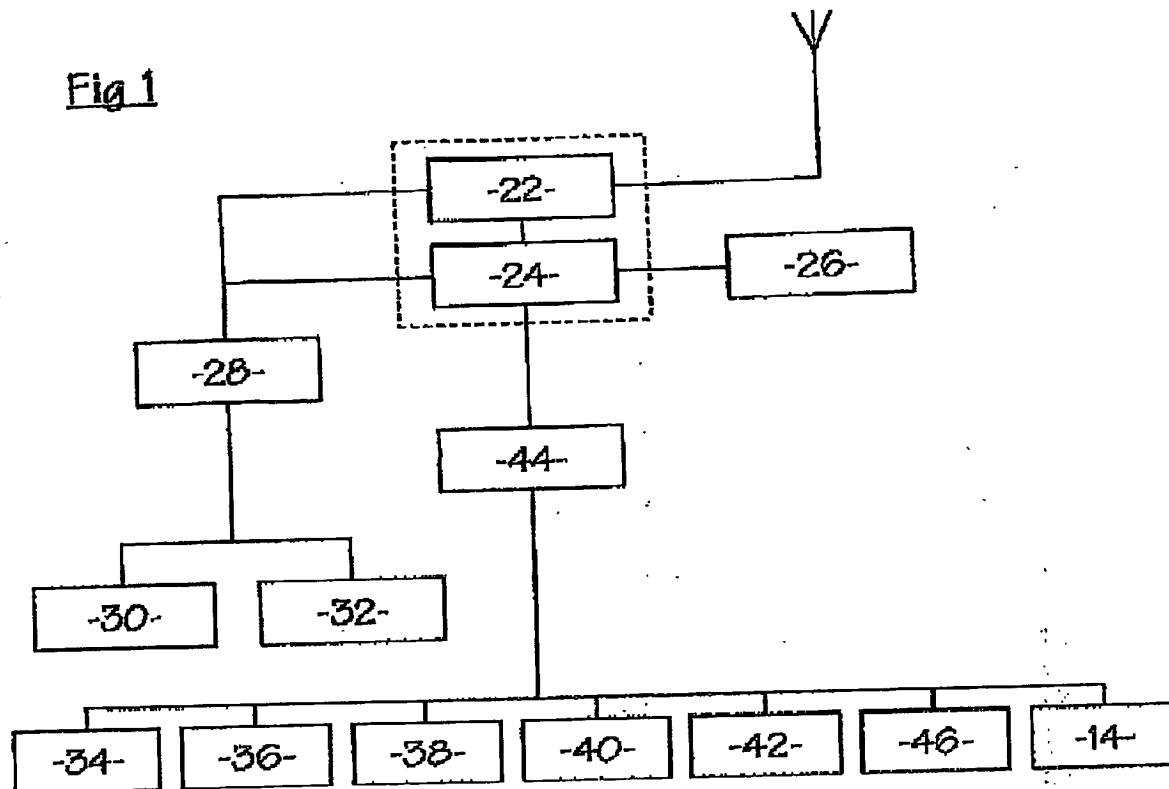
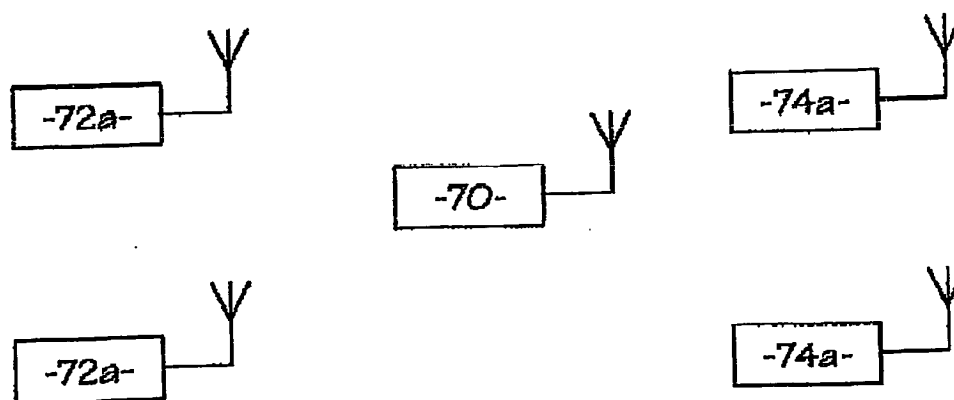


Fig 2



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# Document made available under the Patent Cooperation Treaty (PCT)

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